ACID AEROSOL AND FUEL COMBUSTION REPORTING

ACID AEROSOLS

- Sulfuric acid/hydrochloric acid (acid aerosols including mists, vapors, gas, fog, and other airborne forms of any particle size)
- Sulfuric acid listing modified, effective RY 1994
- Hydrochloric acid listing modified, effective RY 1995

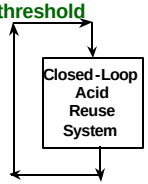
ACID AEROSOLS THRESHOLD DETERMINATIONS

- Manufacture (e.g., acid aerosols manufactured from non-aerosol acid solutions and as by-products of combustion)
- Processing (e.g., acid aerosol or a reaction product is incorporated into a product for distribution into commerce)
- Otherwise Use (e.g., acid aerosol used, such as spray application for etching, cleaning, neutralizing, without incorporation into a product)

ACID AEROSOLS THRESHOLD DETERMINATIONS

- Closed-loop acid reuse systems (sulfuric and hydrochloric acid only)
  - Acid aerosol manufactured and otherwise used
  - Simplified method of estimating quantity for threshold determination:

Total Amount of Acid in Reuse System + Total Virgin Acid Added in RY = Amount Acid Aerosols Manufactured/Otherwise Used



- See EPA's *Guidance for Reporting Sulfuric Acid* (Ref. 1) and *Guidance for Reporting Hydrochloric Acid* (Ref. 6) for specific calculations

ACID AEROSOLS TREATMENT FOR DESTRUCTION

- Acid aerosols removed by scrubbers
  - Acid aerosols removed by scrubbers are converted to a non-reportable form
  - Report the quantity removed by the scrubber as treatment for destruction

ACIDS FORMED DURING COMBUSTION

- Hydrochloric acid aerosols and hydrogen fluoride form during the combustion of fuels/wastes containing chlorine and fluorine
  - See EPA's *EPCRA Section 313 Industry Guidance: Electricity Generating Facilities* (Ref. 2) for emission factors
- Sulfuric acid aerosols form in stacks from combustion processes of fuel oil, coal, and other sulfur-containing fuels
  - Sulfur trioxide, a product of fuel combustion, can react quickly to form sulfuric acid in the presence of moisture
  - See EPA's *EPCRA Section 313 Guidance for Reporting Sulfuric Acid* (Ref. 1) for specific calculations

COMBUSTION

- Section 313 chemicals may be coincidentally manufactured during combustion of:
  - Oil
  - Coal
  - Natural gas
  - Waste
  - Other materials

COMBUSTION - MANUFACTURING

- Examples of manufactured chemicals:
  - Hydrochloric acid aerosol, sulfuric acid aerosol
  - Hydrogen fluoride
  - Metal compounds and metals (e.g., vanadium compounds, mercury)
  - Organics
  - PBT chemicals such as dioxin, PACs, mercury
- *De minimis* does not apply
- Most other exemptions do not apply

COMBUSTION - OTHERWISE USE

- Combustion of fuel is also otherwise used
- *De minimis* (non-PBT chemicals only) and other exemptions could apply to chemicals in the fuel
- Example:
  - 1,2,4-trimethylbenzene and n-hexane in No. 2 fuel oil (Ref. 2)

COMBUSTION & METAL COMPOUNDS

- Metal compounds and elemental metals in fuel are typically converted to metal oxide form
- Elemental metal may also be manufactured (e.g., mercury)
- If no other data available, assume compound is lowest weight oxide that could be manufactured from metal
- Example:
  - Nickel in fuel ® Assume NiO not Ni_2O_3 is manufactured

COMBUSTION & METAL COMPOUNDS

- Amount of metal compound manufactured is determined by the total weight of the compound, not the parent metal
- Be comprehensive: include all metal compounds and all combustion units and any other activities that may manufacture metal compounds
- Releases and other waste management estimates are based on the weight of the parent metal

METAL COMPOUNDS

- Example calculation:
  - During the year, a facility burns 70,000 tons of coal with a manganese (Mn) concentration of 141 micrograms/gram (ppm)

    Lowest weight Mn oxide compound manufactured = MnO

    Molecular weight Mn = 55

    Molecular weight MnO = 71
  - Does the facility exceed the manufacturing threshold for manganese compounds?

METAL COMPOUNDS

- **Amount MnO manufactured**

  = amount coal x concentration Mn x MW_{MnO}/MW_{Mn}

  = 70,000 tons x 2,000 lbs./ton x 141 ppm x 71/55

  = 25,483 lbs. manganese compounds

- **Threshold exceeded**

METAL COMPOUNDS IN COAL

- **Sources of data for calculating amounts manufactured**
  - Fuel analysis, fuel specifications, or other supplier information
  - U.S. Geological Survey's (USGS) coal quality data base. Available at http://energy. er.usgs.gov/products/databases/CoalQual/
  - Electrical Power Research Institute's (EPRI) PISCES data base on coal constituents
  - Tables in EPA's *EPCRA Section 313 Industry Guidance: Electricity Generating Facilities* (Ref. 2)
  - EPA's *EPCRA Section 313 Guidance on Reporting Toxic Chemicals: Mercury and Mercury Compounds* (Ref. 4)
  - EPA's *Mercury ICR* (Ref. 5)
  - EPA's *EPCRA Section 313 Guidance for Reporting Releases and Other Waste Management Quantities of Toxic Chemicals: Lead and Lead Compounds* (Ref. 7)

METAL COMPOUNDS IN OIL

- **Sources of data for calculating amounts manufactured**
  - Producer's fuel analysis, fuel specifications, or other producer information
  - Tables in EPA's *EPCRA Section 313 Industry Guidance: Electricity Generating Facilities* (Ref. 2)
  - EPA's *EPCRA Section 313 Guidance for Reporting Releases and Other Waste Management Quantities of Toxic Chemicals: Lead and Lead Compounds* (Ref. 7)

ORGANICS

- **Organics may be released during combustion)e.g., PACs, formaldehyde)**
- **Manufacture of formaldehyde and releases of other organics**
  - See emission factors in EPA's *EPCRA Section 313 Industry Guidance: Electricity Generating Facilities* (Ref. 2)
- **For more information on PACs:**
  - EPA's *Guidance for Reporting Toxic Chemicals in the Polycyclic Aromatic Compounds Category* (Ref. 3)

RELEASES FROM COMBUSTION

- Sources of data:
  - Monitoring data
  - Facility derived emission factors
  - Emission factors in EPA's *EPCRA Section 313 Industry Guidance: Electricity Generating Facilities* (Ref. 2)
  - Emission factors in EPA's *EPCRA Section 313 Guidance for Reporting Toxic chemicals Within the Dioxin and Dioxin-like Compounds Category* (Ref. 8)

COMBUSTION ASH

- Combustion ash may contain manufactured metals and metal compounds.
- Ash released on-site (e.g., land disposal, fugitive air emissions)
  - *De minimis* exemption does not apply to manufacture of metals and metal compounds as by-products
  - Ash used on-site to construct roads or berms should be reported as otherwise use and as release to land: other disposal (Section 5.5.4 of Form R)

COMBUSTION ASH

- Ash sent off-site to be managed as a waste should be reported in Section 6.2
  - Example:
    - » Ash sent off-site for direct application to land as roadfill
- Ash sent off-site for direct reuse is not reported on the Form R
  - Example:
    - » Ash used to manufacture concrete blocks
      - – Ash considered distributed into commerce and, therefore, processed
      - – *De minimis* exemption can apply

REFERENCES

- For more information:

1. *Guidance for Reporting Sulfuric Acid.* U.S. EPA, Office of Pollution Prevention and Toxics. March 1998. Available at http://www.epa.gov/tri
2. *EPCRA Section 313 Industry Guidance: Electricity Generating Facilities.* U.S. EPA, Office of Pollution Prevention and Toxics. February 2000. Available at http://www.epa.gov/tri
3. Draft *Guidance for Reporting Toxic Chemicals in the Polycyclic Aromatic Compounds Category.* U.S. EPA, Office of Information Analysis and Access. November 2000. http://www.epa.gov/tri
4. Draft *EPCRA Section 313 Guidance on Reporting Toxic Chemicals: Mercury and Mercury Compounds*. U.S. EPA, Office of Information Analysis and Access, November 2000. Available at http://www.epa.gov/tri
5. *Mercury ICR*. U.S. EPA, Unified Air Toxics Website. 1999, Raw data available June 2000. Available at http://www.epa.gov/ttnuatw1/combust/utiltox/utoxpg.html#DA2

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6. *Guidance for Reporting Hydrochloric Acid.* U.S. EPA, Office of Information Analysis and Access. December 1999. http://www.epa.gov/tri

7. *EPCRA Section 313 Guidance for Reporting Releases and Other Waste Management Quantities of Toxic Chemicals: Lead and Lead Compounds*. U.S. EPA, Office of Environmental Information. December 2001. http://www.epa.gov/tri

8. *EPCRA Section 313 Guidance for Reporting Toxic Chemicals within the Dioxin and Dioxin-like Compounds Category.* U.S. EPA, Office of Information Analysis and Access. December 2000. http://www.epa.gov/tri